Title (en)

METHOD OF WELDING METALLIC GLASS WITH CRYSTALLINE METAL BY HIGH-ENERGY BEAM

Title (de)

VERFAHREN ZUR ZUSAMMENSCHWEISSUNG EINES METALLISCHEN GLASES MIT EINEM KRISTALLINEN METALL DURCH EINEN HOCHENERGIESTRAHL

Title (fr)

PROCÉDÉ DE SOUDAGE DE VERRE MÉTALLIQUE AVEC UN MÉTAL CRISTALLIN PAR FAISCEAU À HAUTE ÉNERGIE

Publication

EP 2174743 A1 20100414 (EN)

Application

EP 08791690 A 20080725

Priority

- JP 2008063446 W 20080725
- JP 2007193757 A 20070725

Abstract (en)

[PROBLEMS] To provide a method of welding a metallic glass and a crystalline metal by shifting a high-energy beam scan area from a butting face thereof to the metallic glass side, to fall within a composition range required for glass phase formation of a metallic glass base material in a simplified assured manner. [MEANS FOR SOLVING PROBLEMS] In a welding method for weldingly joining a metallic glass and a crystalline metal together by scanning a high-energy beam in a position shifted from a butt interface between the metallic glass and the crystalline metal toward the metallic glass, it is intended to provide a technique for allowing a composition of a melt zone formed around a welding interface to fall within a composition range required for forming a glass phase in the metallic glass to be joined, in a simple and more reliable manner. A metallic glass (1) and a crystalline metal (2) are butted against each other to define a groove space (Y) over a groove formed on the side of the crystalline metal (2). Then, electron beam welding is performed in a position shifted from the butt interface toward the metallic glass (1) to form a melt zone (4) which has a composition for forming an amorphous metallic glass, and comprises a top fused sub-region (41) and a lower fused sub-region (42), wherein the top fused sub-region has a relatively wide area including the groove space (Y) defined adjacent to an upper end of the butt interface and on the side of the crystalline metal, and the lower fused sub-region extends from the top fused sub-region to reach bottom surfaces of the metallic glass and the crystalline metal, while being narrowingly tapered in a downward direction.

IPC 8 full level

B23K 15/00 (2006.01); **B23K 26/21** (2014.01); **B23K 26/32** (2014.01); **B23K 26/60** (2014.01); **B23K 26/70** (2014.01); B23K 103/18 (2006.01)

CPC (source: EP US)

B23K 15/0093 (2013.01 - EP US); **B23K 26/32** (2013.01 - EP US); **B23K 33/004** (2013.01 - EP US); B23K 2103/05 (2018.08 - EP US); B23K 2103/08 (2018.08 - EP US); B23K 2103/14 (2018.08 - EP US); B23K 2103/18 (2018.08 - EP US); B23K 2103/26 (2018.08 - EP US); B23K 2103/50 (2018.08 - EP US)

Cited by

US8944307B2; WO2014190971A1

Designated contracting state (EPC)

AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MT NL NO PL PT RO SE SI SK TR

Designated extension state (EPC)

AL BA MK RS

DOCDB simple family (publication)

EP 2174743 A1 20100414; **EP 2174743 A4 20170104**; **EP 2174743 B1 20180221**; CN 101765473 A 20100630; CN 101765473 B 20121128; HK 1145665 A1 20110429; JP 5268002 B2 20130821; JP WO2009014221 A1 20101007; KR 101491585 B1 20150209; KR 20100063017 A 20100610; US 2010275655 A1 20101104; US 8404992 B2 20130326; WO 2009014221 A1 20090129

DOCDB simple family (application)

EP 08791690 A 20080725; CN 200880100436 A 20080725; HK 10112225 A 20101230; JP 2008063446 W 20080725; JP 2009524530 A 20080725; KR 20107003516 A 20080725; US 67012508 A 20080725